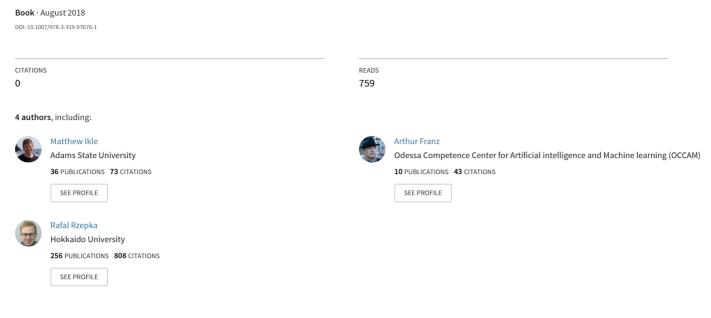
# Artificial General Intelligence



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# Artificial General Intelligence

11th International Conference, AGI 2018 Prague, Czech Republic, August 22–25, 2018 Proceedings



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#### **Preface**

The year 2018 could be considered the year artificial general intelligence (AGI) became mainstream. Since Apple's Siri was first introduced in 2011, narrow AI technologies have permeated increasingly more aspects of our everyday lives. AI systems such as Google's Assistant, Amazon's Alexa, Microsoft's Cortana, iPhone X's face-recognition software, self-driving vehicles, and IBM Watson's text-reading AI for medical research are just a few examples of how AI systems are changing how we live and work on a daily basis.

As these narrow AI systems become increasing prevalent, attention has begun to shift toward the next generation of AI research including AGI. MIT introduced an online graduate course in AGI in 2018, magazines such as *Forbes* have published articles about the potential future of general AI systems, and the Discovery Channel included a segment about AGI in its program "This Is AI." The humanoid robot, Sophia, became the first robot citizen in 2017, and SingularityNET, founded in 2017, began the process of integrating AGI with blockchain technology. These are indeed exciting times.

Despite all the current enthusiasm in AI, the technologies involved still represent no more than advanced versions of classic statistics and machine learning. Behind the scenes, however, many breakthroughs are happening on multiple fronts: in unsupervised language and grammar learning, deep-learning, generative adversarial methods, vision systems, reinforcement learning, transfer learning, probabilistic programming, blockchain integration, causal networks, and many more.

The 11th AGI conference took place in Prague, Czech Republic, during August 22–25, 2018. For the second time, the AGI conference was held as part of the larger Joint Multi-Conference on Human-Level Intelligence, HLAI, which co-located AGI 2018 with BICA 2018 (the Annual International Conferences on Biologically Inspired Cognitive Architectures), and NeSy 2018 (the Workshop Series on Neural-Symbolic Learning and Reasoning). Also included as part of HLAI 2018 was a separate day-long track, following the main sessions, discussing "The Future of AI."

This volume contains the contributed talks presented at AGI 2018. Of the 52 papers submitted to the conference and reviewed by two or more Program Committee members, 19 long papers papers were accepted (37% acceptance) for oral presentation, and ten papers were accepted for poster presentations. One hallmark of the AGI conference series has always been the incredible diversity of ideas on display through its collection of contributed papers, and this year continued that trend. There are papers covering AGI architectures, papers discussing mathematical and philosophical foundations and details, papers developing ideas from neuroscience and cognitive science, papers on emotional modeling, papers discussing ethical strategies, and a host of other papers covering a wide-ranging array of additional relevant topics.

Keynote speeches were shared by the participating organizations and included speeches by Ben Goertzel (SingularityNET, and Hanson Robotics), Thomas Parr

(University College London), Tomas Mikolov (Facebook AI Research), Paul Smolensky, (Microsoft), Dileep George, (Vicarious Systems), Dr. Vladimir G. Red'ko (Russian Academy of Sciences), and Hava Siegelmann (DARPA). Josef Urban delivered an additional AGI keynote on the topic "No One Shall Drive Us from the Semantic AI Paradise of Computer-Understandable Math and Science."

In addition, the AGI 2018 conference featured a "Tutorial on Comparing Intrinsic Motivations in a Unified Framework"; workshops on "AI4Space, AI for Space Exploration and Settlement," and "AI Meets Blockchain"; a symposium on "AI Safety and Societal Impacts"; a panel session covering "Machine Consciousness"; and a demonstration session.

We thank the people of GoodAI, in particular Olga Afanasjeva and Daria Hvizdalova, for all of their help planning and handling local organization; Tarek Beshold for having the vision for the larger Human Level AI conference series; and all the Program Committee members for their dedicated service to the review process. We thank all of our contributors, participants, and tutorial, workshop, and panel session organizers, without whom the conference would not exist.

Finally, we thank our sponsors: the Artificial General Intelligence Society, Springer Nature Publishing, SingularityNET, Hanson Robotics, and OpenCog Foundation.

June 2018

Matthew Iklé Arthur Franz Rafal Rzepka Ben Goertzel

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